**IoT project for Innovation in Health Care Industry**

Smart Medication Management System

Project Overview

This project aims to develop a Smart Medication Management System that ensures patients adhere to their prescribed medication schedules. The system uses IoT to track medication intake, send reminders, and notify healthcare providers of any discrepancies, improving medication adherence and overall patient health outcomes.

**Components**

Virtual Microcontroller: ESP32 (simulated on Wokwi)

Virtual Sensors: Simulated sensors to detect medication intake

Cloud Service: Blynk or another cloud-based service for data logging and notifications

Mobile App: For reminders and user interface

Local Server: For local data processing and backup

**Key Features:**

**Medication Detection**: Sensors to detect when a patient takes their medication.

**Reminders and Alerts**: Automated reminders for patients to take their medication.

**Data Logging**: Cloud-based logging of medication intake data.

**Notifications**: Alerts to healthcare providers if a patient misses a dose.

**User Interface**: Mobile app for patients to manage their medication schedule.

**Steps:**

* Virtual Setup on Wokwi

ESP32 Setup: Create a virtual ESP32 project on Wokwi.

Sensor Simulation: Simulate sensors that detect medication intake.

* Cloud Integration

Blynk Configuration: Set up a Blynk project for data logging and notifications.

Wi-Fi Connection: Configure ESP32 to connect to Wi-Fi and Blynk.

* Mobile App

Blynk App: Use the Blynk app to create a user interface for reminders and alerts.

Notification Setup: Set up notifications for missed doses.

* Programming the ESP32

Medication Detection Code: Write code to detect medication intake and log data.

Code:

#define BLYNK\_TEMPLATE\_ID "TMPL3237pTtBw"

#define BLYNK\_DEVICE\_NAME "Smart Hospital System"

#define BLYNK\_AUTH\_TOKEN "G5GjwBdZUu5Nvoz\_le4iswzZ1VVyb77u"

#include <WiFi.h>

#include <BlynkSimpleEsp32.h>

char auth[] = BLYNK\_AUTH\_TOKEN;

char ssid[] = "Redmi";

char pass[] = "kaveri123";

int medicationSensorPin = 34; // Simulated sensor pin

void setup() {

pinMode(medicationSensorPin, INPUT);

Blynk.begin(auth, ssid, pass);

}

void checkMedication() {

int sensorValue = digitalRead(medicationSensorPin);

if (sensorValue == HIGH) { // Medication taken

Blynk.virtualWrite(V1, 1); // Log intake

Blynk.notify("Medication taken");

} else {

Blynk.virtualWrite(V1, 0); // Log missed dose

Blynk.notify("Missed medication dose");

}

}

void loop() {

Blynk.run();

checkMedication();

delay(60000); }

**4.** **Benefits and Impact**

**Benefits of the Smart Medication Management System**

**1. Improved Medication Adherence**

* Automated Reminders: Patients receive timely reminders to take their medication, reducing the chances of missed doses.
* Real-Time Tracking: The system tracks medication intake in real-time, ensuring that patients follow their prescribed schedule.

**2. Enhanced Patient Safety**

* Missed Dose Alerts: Alerts healthcare providers if a patient misses a dose, allowing for timely intervention.
* Prevent Overdose: By tracking medication intake, the system can prevent accidental overdoses by ensuring patients do not take extra doses.

**3. Better Health Outcomes**

* Consistent Medication Regimen: Ensures patients take their medication consistently, leading to better management of chronic conditions and improved health outcomes.
* Reduced Hospital Readmissions: Improved adherence can lead to fewer complications and hospital readmissions.

**4. Convenience for Patients**

* User-Friendly Interface: The mobile app provides an easy-to-use interface for patients to manage their medication schedule.
* Customized Reminders: Patients can customize reminders according to their preferences, making it easier to adhere to their medication regimen.
* Prevent Overdose: By tracking medication intake, the system can prevent accidental overdoses by ensuring patients do not take extra doses.
* Customized Reminders: Patients can customize reminders according to their preferences, making it easier to adhere to their medication regimen.

**5. Data-Driven Insights**

* Medication Intake Data: Healthcare providers can access detailed data on medication intake, helping them make informed decisions about patient care.
* Identify Patterns: Analyzing data can help identify patterns in medication adherence, allowing for personalized interventions.

**6. Enhanced Communication**

* Healthcare Provider Notifications: Real-time notifications to healthcare providers enable better communication and timely responses to medication adherence issues.
* Patient Feedback: Patients can provide feedback on their medication regimen through the app, helping healthcare providers adjust treatment plans as needed.

**7. Scalability and Flexibility**

* Adaptable to Different Medications: The system can be adapted to track various types of medications and schedules, making it versatile for different patient needs.
* Scalable Infrastructure: The cloud-based infrastructure allows the system to scale up to accommodate more patients and data.

**8. Cost Savings**

* Reduced Healthcare Costs: By improving medication adherence, the system can help reduce healthcare costs associated with non-adherence, such as emergency visits and hospitalizations

**5. Conclusion**

The Smart Medication Management System is an innovative IoT-based solution designed to improve medication adherence among patients. Utilizing a virtual microcontroller like ESP32, the system integrates with cloud services such as Blynk to provide real-time tracking, automated reminders, and alerts. This ensures that patients take their medication on time and healthcare providers are notified of any missed doses.

The project can be developed and simulated virtually using platforms like Wokwi, eliminating the need for physical hardware. This makes it accessible and scalable, offering a versatile solution adaptable to various types of medications and patient needs.

Overall, the Smart Medication Management System represents a significant advancement in healthcare technology, providing a comprehensive and effective approach to ensuring patients adhere to their prescribed medication schedules.

**6. References**

IoT Innovation paper, IEEE Papers